

forming a second layer comprising silicon oxide on said first layer by CVD using a second reactive gas comprising at least TEOS.--

REMARKS

The Examiner's action of October 18, 1993 was received and carefully reviewed. Claims 27-28 were rejected under 35 U.S.C. §112, second paragraph. These claims have been amended to overcome this rejection. Claims 16, 18-21, 23 and 30 were rejected under 35 U.S.C. §103 over cited art discussed in detail below. Applicants respectfully traverse this rejection. In addition, new claim 31 has been added which corresponds to cancelled claim 7. Currently, claims 16-31 are currently pending in the instant application.

Initially, Applicants also acknowledge with appreciation the Examiner's finding of allowable subject matter in claims 17, 22 and 24. The Examiner indicated that these claims would be considered allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claim.

It is noted that claim 22 is already in independent form. Therefore, claim 22, as well as claim 24 depending therefrom, should be in a condition for allowance.¹ Claim 17 has been rewritten in independent form. As a result, claim 17 should likewise be in a condition for allowance.

Addressing the Examiner's formalistic objections and rejections beginning on page 6 of the Office Action, the Examiner requests that

¹ Claim 22 has been slightly amended to change "photo" to "electrical" in line 9 thereof.

"previously noted" errors be corrected in the specification. Applicants have been unable to find any reference to errors noted in the specification in "paper no. 2" and, therefore, request further clarification.

Claims 27-28 have been rejected under 35 U.S.C. §112, second paragraph. Specifically, the use of the term "about" in claim 27 is considered indefinite, and the use of the term "buffer layer" in claim 28 is considered unconventional and confusing. Claim 27 has been amended to delete the word "about".

With regard to claim 28, Applicants believe that "buffer layer" is a conventional term used in the art to describe a layer which is intended to separate one layer from another and prevent contamination therebetween. However, in order to overcome the Examiner's rejection, claim 28 has been amended to change "buffer" to "blocking". In view of the foregoing, claims 27 and 28 should now be in a condition for allowance.

Claims 16, 18-21, 23 and 30 were rejected under 35 U.S.C. §103 over Ivanov et al., in view of Maeda et al. Further, claims 25-28 were rejected under 35 U.S.C. §103 over these references, further in view of Wolf and claim 29, further in view of Kedyarskin et al.

The present invention is directed to method of forming a film on a substrate which utilizes both photo energy and electrical energy to excite the reactive gas. The reactive gas comprises at least TEOS. Specifically, the method includes placing a substrate in a reaction chamber, introducing a reactive gas comprising at least TEOS, exciting the reactive gas by supplying photo and electrical energies into the reaction chamber and depositing a film on the substrate. The photo energy and electrical energy may be supplied simultaneously or sequentially. The film formed may be silicon oxide. In addition, two films may be formed wherein one film is formed using photo energy to excite the reactive gas while the second film is formed using electrical excitation energy.

Ivanov (Abstract) discloses a method for phasmo-chemical synthesis of silicon dioxide by oxidizing $\text{Si}(\text{OEt})_4$ in a plasma containing oxygen. Maeda (Abstract) discloses a method of preparing a SiO_2 film using a vapor phase process where the reactive gas may include a silane (TEOS) and N_2O , NO_2 , NO , CO_2 , CO , or NH_3 and may be excited by UV light.

Ivanov does not appear to disclose the use of electrical energies to create the plasma disclosed therein. In fact, Ivanov expressly discloses in the Abstract that an electrodeless plasma is used. Therefore, the Examiner has failed to show the use of an electrically excited plasma wherein the reactive gas includes TEOS. Furthermore, even if a reference utilizing electrically excited plasma including TEOS in a CVD process is asserted by the Examiner, the Examiner has failed to show any suggestion in the art to utilize both an electrical energy and photo energy to excite a plasma in a CVD process.

In order to overcome this deficiency, the Examiner cites *Ex parte Novak*, 16 U.S.P.Q.2d 2041 (Bd.App.&Int. 1990), which the Examiner indicates holds that it is obvious to combine two old process steps for accomplishing the same goal.

The Examiner has expanded the true holding of this case to fit his rejection. This case involved the substitution of steps shown in the prior art for making soluble or instant coffee wherein two process steps were claimed to improve the flavor of instant coffee, rather than one or none. The Board of Appeals held that it would be expected that the use of two process steps, each designed to improve flavor, would provide even greater flavor improvement.

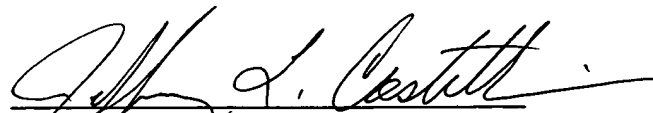
This situation is not present in the instant case. Specifically, claims 16 and 23 recite supplying both photo and plasma or electrical energies to the reactive gas in order to decompose the gas. The Examiner has merely tried to combine two references which separately show the use of electrical energy

and photo energy, each designed to create a plasma. The use of these particular energies are not designed to provide any improvement, but instead are types of energies which can accomplish a similar purpose. Therefore, there is no suggestion that a combination of these energies would provide an enhanced plasma as was present in the cited case.

The Examiner relies on Wolf to teach formation of a plurality of leads wherein the leads may comprise aluminum to reject claims 25-28. Wolf has a copyright of 1990 which is after the effective filing date of the instant application, namely, September 1, 1987. Therefore, Wolf is not available as a reference. Furthermore, even if Wolf were available as a reference, it fails to remedy the deficiencies of the Examiner's primary references and also fails to disclose the specific dimensions recited in claim 27. Therefore, claims 25-28 should likewise be considered allowable.

In view of the foregoing, it is respectfully requested that the rejections of record be reconsidered and withdrawn, that claims 16-30 be considered allowable, that new claim 31 be considered allowable and that the application be passed to issue. If the Examiner believes a conference would be beneficial in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,


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